REMARKS

Claims 1-9, 11-16 and 18-23 are currently pending in the subject application and are presently under consideration. Claims 1, 2, 6, 7, 11-15, 21, and 23 have been amended as shown on pages 2-6 of the Reply. In addition, claim 18 has been cancelled.

Applicant's representative thanks Examiners Berman and Starks for the courtesies extended during the telephonic interview conducted on October 10, 2007. Participants discussed the amendments to overcome the claim rejections under 35 U.S.C. §112. Examiner Berman indicated that the amendments appear to satisfy her concerns with regard to these rejections. Participants also came to an agreement on appropriate amendments to overcome the rejections under 35 U.S.C. §101. These amendments are included herein.

Finally, participants discussed the interpretation of the cited art references with respect to the features of the subject claims. Examiner Starks provided helpful suggestions for amendments that he believed would likely overcome the rejections under 35 U.S.C. §103(a) in view of the cited art references. These suggestions have been incorporated into the amended claim set found herein.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein.

I. **Objections to Claims 1, 2, 7, 11-15, and 23**

Claims 1, 2, 7, 11-15, and 23 are objected to because the Examiner contends the phrase "and/or" is not clear in the scope. The aforementioned claims have been amended to address the Examiner's concerns with regard to this objection.

II. **Rejection of Claims 1-9, 11-16 and 18-23 Under 35 U.S.C §112**

Claims 1-9, 11-16 and 18-23 stand rejected under 35 U.S.C §112, first paragraph, as failing to comply with the written description requirement. The Examiner asserts that, although the independent claims describe non-standardized data being scored based on virtually shifting and scaling the data, the same independent claims only establish that the non-standardized data is virtually *shifted*, not shifted and scaled. However, in accordance with the specification, amended independent claims 1, 11, 14, and 21 disclose that the

non-standardized data can be *at least one of virtually shifted* through omission of a matrix operation *or virtually scaled* through modification of a subset of elements relating to a covariance matrix. Thus, the amended independent claims teach that the non-standardized data can be virtually shifted, virtually scaled, or both virtually shifted and virtually scaled.

The Examiner also contends that the disclosure does not describe a way in which the data can only be virtually shifted and not virtually scaled to achieve a score. However, Figure 3 and paragraphs [0036] – [0039] of the specification illustrate that the decision to apply virtual shifting and the decision to apply virtual scaling can each be made independently, and that one can be applied without the other when computing a score. Moreover, Figure 6 and paragraph [0053] further establish that a score can be determined by applying virtual shifting without applying virtual scaling (note that Figure 7 and paragraph [0054] demonstrate the reverse case; namely, that a score can also be determined by applying virtual scaling but not virtual shifting). Finally, paragraph [0055] reiterates that both virtual shifting and virtual scaling can be applied. In view of these citations, it is respectfully submitted that the specification clearly supports the calculation of a score whereby any combination of virtual shifting and virtual scaling can be applied, including but not limited to the application of virtual shifting without virtual scaling, and that the amended independent claims are fully supported by the specification in this regard.

The Examiner also takes issue with the "data fields" described in independent claim 21. This claim has been amended to address the Examiner's concerns with regard to this issue.

In view of the foregoing discussion and corresponding claim amendments, it is respectfully requested that this rejection be withdrawn with respect to independent claims 1, 11, 14, and 21, and all claims depending there from.

III.   Rejection of Claims 1-9, 11-16 and 18-23 Under 35 U.S.C. §101

Claims 1-9, 11-16 and 18-23 stand rejected under 35 U.S.C. §101 because it is alleged the claimed invention is directed to non-statutory subject matter. Withdrawal of

this rejection is requested for at least the following reasons. Contrary to the Examiner's contentions, the claimed subject matter produces a useful, tangible, and concrete result.

> Because the claimed process applies the Boolean principle [abstract idea] *to produce a useful, concrete, tangible result* ... on its face the claimed process comfortably falls within the scope of §101. *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358. (Fed. Cir. 1999) (Emphasis added); *See State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373, 47 USPQ2d 1596, 1601 (Fed.Cir.1998). The inquiry into patentability requires an examination of the contested claims to see if the claimed subject matter, as a whole, is a disembodied mathematical concept representing nothing more than a "law of nature" or an "abstract idea," or if the mathematical concept has been *reduced to some practical application rendering it "useful*." *AT&T* at 1357 *citing In re Alappat*, 33 F.3d 1526, 31 1544, 31 U.S.P.Q.2D (BNA) 1545, 1557 (Fed. Cir. 1994) (emphasis added).

The Examiner asserts that the claimed subject matter is not directed toward a practical application. However, as is clearly established in the subject claims, the score produced by the scoring component can be employed by users or subsequent automated components when determining model performance or selecting between models or model subsets. The foregoing clearly represents a practical application of the systems and methods disclosed by the subject claims, and thus constitutes a useful, tangible, and concrete result. To underscore the fact that the subject claims do indeed produce a useful, concrete, and tangible result, independent claims 1, 11, 14, and 21 have been amended to recite, *the score is at least one of stored on a computer-readable storage medium, displayed on a display device, employed by one or more processes executing on one or more processors, or transmitted between two or more processes executing on one or more processors.*

In view of at least the foregoing, it is respectfully submitted that the subject claims are clearly directed toward a practical application that produces a useful, concrete, and tangible result. Accordingly, this rejection should be withdrawn.

IV.   Rejection of Claims 1-3, 5-7, 11-15 and 19-23 Under 35 U.S.C. §103(a)

Claims 1-3, 5-7, 11-15 and 19-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chickering, *et al*. ("Efficient Determination of Dynamic Split Points in a Decision Tree", Proceedings of the IEEE International Conference of data Mining, November 29 – December 2, 2001) and further in view of Riskin, *et al*. ("Lookahead in Growing Tree-Structured Vector Quantizers", 1991). It is respectfully requested that this rejection be withdrawn for at least the following reasons. Chickering, *et al*. and Riskin, *et al*., individually or in combination, fail to teach or suggest each and every feature of the subject claims.

> [T]he prior art reference (or references when combined) must teach or suggest all claim limitations. *See* MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *See In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The present claims relate to an efficient process for scoring splits in a decision tree in order to evaluate a model's performance. The scoring can be performed using non-standardized (that is, non-shifted and non-scaled) data, but scored as if the data were shifted and scaled (*i.e.* virtual shifting/scaling). This can allow the resulting decision trees to be less sensitive to "uninformative" prior information without incurring the additional performance penalties associated with actual shifting and scaling operations. To this end, the virtual shifting operation can be performed by computing the score assuming each variable has a mean of zero, thus allowing a matrix operation associated with the scoring computation to be omitted. In particular, amended independent claim 1 (and similarly independent claims 11, 14, and 21) recites, *the non-standardized data is at least one of **virtually shifted through omission of a matrix operation** or virtually scaled through modification of a subset of elements relating to a covariance matrix.*

As conceded in the Office Action, Chickering, *et al*. does not teach or suggest this feature of the subject claims. The Examiner cites Riskin, *et al*. to remedy this deficiency in Chickering, *et al*., asserting in particular that the "lookahead" step disclosed in Riskin, *et al*. reads on the virtual shifting of the present claims. However, applicant's

representative respectfully submits that the lookahead step described in Riskin, *et al.* is not comparable to the virtual shifting taught by the subject claims, nor does the cited lookahead feature produce a comparable result. Riskin, *et al.* relates to technique for designing variable rate tree-structured vector quantizers. The technique utilizes the aforementioned lookahead step, whereby a decision whether or not to split a node is based in part on an evaluation of whether the split would result in a child node that could itself be split to produce a large decrease in node impurity (in image coding applications, with which the cited reference appears primarily concerned, node impurity can be a representation of video distortion). However, performing a lookahead evaluation to determine if a node should or should not be split does not produce a result that scores a node as if data had been *shifted*. Shifting non-standardized data results in a zero mean for the data. As noted above, the subject claims can perform a virtual shifting of non-standardized data by calculating the score for a node assuming a zero mean for the data without actually shifting the data. The lookahead feature of the cited reference does not in any way simulate the results of a shifting operation on non-standardized data, and therefore does not read on or make obvious the virtual shifting of the subject claims.

Moreover, virtual shifting of non-standardized data can permit omission of a matrix operation when computing a score for a split in the tree. Thus, the overall complexity of the scoring calculation can be reduced and system performance improved as a result of the virtual shifting. In contrast, the lookahead feature taught by Riskin, *et al.* entails *additional* computations, and therefore *increases* the complexity of the process (see page 2290, column 1, last paragraph: "Adding a lookahead step would rule this out, in some cases at the cost of adding additional complexity to the growing process." See also the description of the lookahead process on page 2290, column 2). Hence, the virtual shifting operation of the subject claims can yield a benefit not provided by the lookout step of the cited reference, *viz.* a reduction in computational complexity and a corresponding increase in system performance.

Additionally, the subject claims teach that a determination can be made whether to apply the aforementioned virtual shifting operation, or alternately to perform an actual shifting operation on the set of data. The same determination can be made regarding whether to virtually scale or to actually scale the data. The score for a split in the

decision tree can then be computed according to the determinations. In particular, amended independent claim 14 (and similarly amended claim 12) recites, ***determining whether to perform a virtual shifting operation*** *on a non-standardized set of data with a non-zero mean_associated with leaves of a decision tree;* ***determining whether to perform a virtual scaling*** *operation on the non-standardized set of data; and* ***automatically assigning scores to the leaves based in part upon the determinations of whether to perform the virtual shifting and/or and virtual scaling operations.*** As discussed above, neither Chickering, *et al.* nor Riskin, *et al.* disclose a *virtual shifting operation* as taught by the subject claims. Therefore, both references are also silent regarding *making a determination to perform a virtual shifting operation* on a data set.

In view of at least the foregoing, it is respectfully submitted that Chickering, *et al.* and Riskin, *et al.*, individually or in combination, fail to teach or suggest each and every feature of applicant's claimed subject matter as recited in independent claims 1, 11, 14, and 21 (and all claims depending there from), and therefore fail to make obvious the subject claims. It is therefore requested that this rejection be withdrawn.

V.   Rejection of Claim 4 Under 35 U.S.C. §103(a)

Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Chickering, *et al.* and Riskin, *et al.* and further in view of Heckerman (Bayesian Networks for Data Mining, 1997). Claim 4 depends from amended independent claim 1. As discussed *supra*, neither Chickering, *et al.* nor Riskin, *et al.* teach or suggest virtually shifting non-standardized data through omission of a matrix operation. Heckerman is similarly silent regarding this aspect of the subject claims. Heckerman provides a tutorial on Beyesian techniques for data mining, but nowhere teaches or suggests *virtually shifting non-standardized data through omission of a matrix operation* as disclosed in amended independent claim 1. Accordingly, this rejection should be withdrawn with respect to claim 4, which depends from that independent claim.

VI.   Rejection of Claims 8, 9, 16 and 18 Under 35 U.S.C. §103(a)

Claims 8, 9, 16 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chickering, *et al.* and Riskin, *et al.* and further in view of Minka (Bayesian linear regression, 1999). Claims 8 and 9 depend from amended independent claim 1, while claims 16 and 18 depend from amended independent claim 14. As discussed above with respect to those independent claims, both Chickering, *et al.* and Riskin, *et al.* are silent with regard to *virtually shifting non-standardized data through omission of a matrix operation.* Minka fails to make up the shortcomings of those cited art references. Minka provides a discussion of Bayesian linear regression, using a data model with Gaussian noise added for demonstration purposes. However, Minka does not teach or suggest virtually *shifting non-standardized data* as disclosed by the aforementioned independent claims. It is therefore respectfully submitted that this rejection be withdrawn with respect to claims 8, 9, 16, and 18, which depend from those independent claims.

CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063[MSFTP485US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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